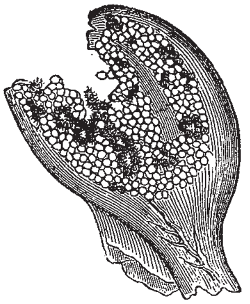
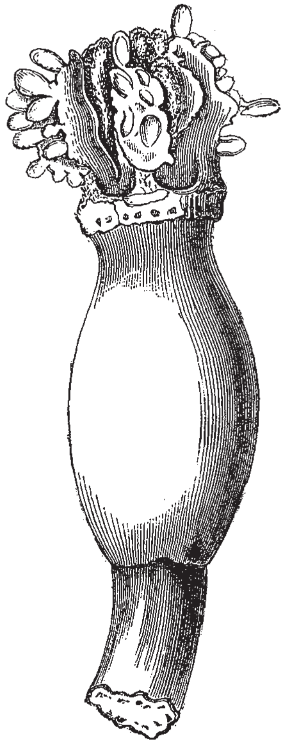
VEGETABLE MONSTROSITIES

Vegetable Teratology: An Account of the Principal Deviations from the usual Construction of Plants. By Maxwell T. Masters, M.D., F.L.S. With numerous illustrations by E. M. Williams. (Published for the Ray Society. 1869.)

IN the volume before us we have the most complete account that has yet been given to the public of the various aberrant forms which are from time to time presented by the different organs of which plants are composed. Such investigations are no mere idle amusement for the leisure hours of naturalists, but have an important scientific bearing. Since botanists have attempted to arrange the vegetable kingdom in a classification possessing a higher claim to the title of "natural" than that proposed by Linnæus, it has been acknowledged that the true, though hidden, relationships of a genus may often be indicated by an abnormal or monstrous variety. A new interest has been given to these inquiries by the theory, now so generally adopted by naturalists, that affinity in structure is but an indication of consanguinity in descent; these exceptional forms or "sports" being regarded as frequently reversions to an ancestral type of structure. Apart, however, from such modifications as are of importance in systematic botany, there are others which are noteworthy as throwing light on controverted points in morphology, and on the relation to one another of the different organs. Among these are the exact morphological character of the carpel, viewed in the light of a metamorphosed leaf; and of the so-called "inferior" ovary, whether its covering is to be considered as a united calyx-tube, or as a modified continuation of the axis. The occasional substitution of one organ for another is carried to a far greater extent in the vegetable than ever appears, even occasionally, in the animal kingdom. As Dr. Masters remarks, the animal physiologist would regard as an incredible monstrosity the replacement of sperm-cells by germ-cells, or the converse; although these are comparable to abnormal growths, of which several are recorded, where ovules are borne by stamens, or pollen is produced inside ovules. The two wood-cuts which we give illustrate these remarkable transformations.


Pollen within Ovule of Passiflora


Ovule-bearing Anther of Cucurbita

De Candolle was the first systematic botanist to draw attention to the importance of Vegetable Teratology: he was followed by Moquin-Tandon, Morren, and others; and the great work of Moquin-Tandon has been followed by Dr. Masters in the main in classifying the phenomena under discussion. This classification of an enormous number of isolated facts presents considerable difficulties. It might at first sight appear as if the most natural arrangement would be to arrange under one head all the known modes of malformation or aberration of each organ: but this plan would involve much repetition, from the frequency with which it happens that similar organs are abnormally affected in the same manner; as when the parts of the calyx and corolla are both unduly increased in number. The plan adopted by Dr. Masters, though very artificial, possesses the advantage of clearness and of easy reference. He divides the phenomena of Teratology into four sections: 1, Deviations from ordinary Arrangement; 2, Deviations from ordinary Form; 3, Deviations from ordinary Number; 4, Deviations from ordinary Size and Consistence; each with several subdivisions. Until we know more of the cause of these variations from ordinary structure, a more scientific classification would appear to be hopeless.

The work is essentially one of reference, a collection of facts rather than a statement of theories. An enormous number of instances, illustrative of every conceivable variation from normal structure, has been collected with unwearied assiduity from English and foreign records, and with that personal knowledge of the subject which few possess to so great a degree as the author. Where Dr. Masters so far strays from his subject as to enter into morphological questions, as when he discusses the irregular monandrous flower of Orchids, we are tempted to wish that he had permitted himself more digressions of the kind.

The text is illustrated by a large number of woodcuts, original and copied, which add greatly to the clearness of the descriptions; and not the least valuable portion of the work is the long list of references at the end of each section to papers and monographs bearing upon it, forming a complete bibliography of the subject. In the lists of plants which are mentioned as peculiarly subject to each description of malformation, we could wish that more care had been taken not to designate the same plant by more than one scientific name, a practice confusing to the student. We also regret that in some instances recognised botanical terminology has been departed from; as in the distinction drawn by Lindley and Oliver between "regularity" and "symmetry." These, however, are but minor defects in a work which we can cordially recommend to all students of botany, who are interested in the real structure of the various organs of plants. A. W. BENNETT

ATTFIELD'S CHEMISTRY

Chemistry: General, Medical, and Pharmaceutical, including the Chemistry of the British Pharmacopœia. By John Attfield, Ph.D., F.C.S. 1 vol. pp. 624. (London: Van Voorst.)

THIS book is mainly intended to supply the want of a manual more expressly suited to the requirements of students of medicine and of pharmacy. A work of this nature necessarily differs in many particulars from the ordinary run of chemical manuals, and it would be unjust, therefore, to judge of it altogether by the standards generally employed in determining the degree of excellence of such books. It is obviously impossible for the medical student to make himself acquainted with the multitude of organic compounds known, the greater portion of which are simply interesting to the scientific chemist on account of the theoretical opinions based on them; and hence it would manifestly be absurd to censure the author of this book for the fact that much of what constitutes modern

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organic chemistry is either but cursorily treated, or altogether omitted. Nor, on the other hand, should he be blamed for giving what might otherwise appear undue prominence to the descriptions of substances which are simply interesting from the fact of their application as remedial agents, but of which the chemical constitution is either entirely unknown or but imperfectly understood. In all that concerns the most immediate objects which the author had in view in its compilation, his book is a faithful record of the present state of the science. Thus, on page 353 we notice a very complete description of the method of preparing the newly-discovered alkaloid apomorphia, the remarkable physiological effects of which have lately attracted so much attention. The plan of the work is entirely novel. The author commences with some very pertinent advice to candidates as to the best method of studying the book in order to fit themselves for examination by the various boards. After the usual introduction, the student passes on to the practical study of the general properties of the non-metallic elements, and when he has familiarised himself with the various manipulative processes, and acquired a certain amount of chemical knowledge, he proceeds to the study of the general principles of chemical philosophy. The properties of the various metallic elements, their official preparations, and the tests employed in their detection, next engage his attention; after which he is put through a systematic course of qualitative analysis. The student next occupies himself with the study of the compounds of vegetable and animal origin, with the reactions of the alkaloids and of some other organic principles, and of the various substances which the author distinguishes as Galenical, and which can only fairly be regarded from a pharmaceutist's point of view, many of them being "not yet brought within the grasp of the chemist." The principles of toxicology, and the various methods employed in the examination of morbid urine and calculi, are then explained, and the different classes of official, Galenical, and chemical preparations enumerated. A course of quantitative analysis, sufficiently comprehensive for the student's requirements, and consisting of both gravimetric and volumetric processes, next follows. Several of the gravimetric methods are, however, in our opinion not the best at the disposal of the analyst. Thus, for the estimation of nitric acid Frankland and Armstrong's method of determining the amount of that acid in potable waters, is the only one recommended. This method, although doubtless excellently adapted to the purpose for which it was devised, is not, however, generally applicable. We would recommend the method of Vernon Harcourt to Dr. Attfield's attention. With some slight modifications, this method is pronounced by Professor Bunsen, of Heidelberg, in whose laboratory it is constantly used, to be by far the best of the many processes hitherto proposed for the estimation of nitric acid; and in the laboratory to which the writer is attached it is frequently employed with the most satisfactory results. The account given of the processes for the ultimate analysis of organic substances also appears to be somewhat defective, and the statement that the best combustion-furnace is that known as Hofmann's is open to dispute. The furnaces of Eslenmeyer and of Donny as modified by Glaser are certainly to be preferred; indeed, we understand that the Berlin professor has already renounced the use of the furnace which bears his name. Dr. Attfield is surely in error, also, in recommending (page 460) that the boiling point of a liquid should be determined by inserting the bulb of the thermometer in the heated liquid. Kopp pointed out long ago the errors incidental to this method of procedure. These, however, are defects of but minor importance, and may easily be remedied in future editions. We have derived much satisfaction from the perusal of Dr. Attfield's book: it is eminently practical in its character, and is written with a just appreciation of the small amount of time for the study of chemistry at the disposal of the student in medicine and pharmacy.

T. E. T.

OUR BOOK SHELF

Japanese Shells.—*Japanische Meeres-conchylien.* By Dr. C. E. Lischke. (Cassell: 1869.) Quarto, with 14 coloured plates.

JAPAN is not less remarkable for the works of its people than for its natural productions. Its sea-shells are of a mixed character, arctic and tropical. Some species range to the Mediterranean; for *Verticordia granulata* of Seguenza, from the Sicilian tertiaries, which I have now discovered living in the Gulf of Egina at a depth of 130 fathoms, was lately dredged by Mr. A. Adams in the seas of Japan, and is described by him as *V. multicostata.* Another species of *Verticordia*—or perhaps more correctly *Hippagus*—the *H. acuticostatus* of Philippi, a Calabrian and Sicilian fossil (which occurs also in our Coralline Crag, under Sowerby's name of *V. cardiiformis*), is the *V. Deshayesiana* of Fischer, and *V. Japonica* of A. Adams, from China and Japan. The only other known living species of *Hippagus* (*Trigonulina ornata*, D'Orbigny = *H. novemcostatus*, Adams and Reeve) is common to the West Indies and China. Unfortunately we know far too little of the former and present course of those great currents which traverse the ocean in every direction, to be able to explain satisfactorily the geographical distribution of the marine fauna. Nevertheless, although physical data are wanting, zoological facts are accumulating; and Dr. Lischke, as well as Mr. Arthur Adams, have rendered great assistance by their investigation of the Japanese mollusca. The present is not a complete treatise on the subject; but it shows great care and critical acumen, and it is beautifully illustrated. The author is Oberburgomeister of the large manufacturing town of Elberfeld, and finds time not only for his onerous public duties, but also for good scientific work; so that in other countries besides our own, writers on natural history are not confined to the class of paid professors.

J. GWYN JEFFREYS

Chemistry for Schools.—*An Introduction to the Practical Study of Chemistry.* By C. Haughton Gill, Assistant Examiner in Chemistry at the University of London. (London: Walton.) 8vo. pp. xv. and 315. 1869.

DURING the last few years the subject of science teaching in schools has occupied so much attention that a special class of manuals has been originated for the schoolmaster's use. Those which treat of Chemistry have been in some cases experiments, seldom remarkable for true appreciation of their professed purpose, or, perhaps, merely the pecuniary speculation of an ignorant writer. Under such circumstances, it is gratifying to meet with a book of this kind, which really is what it was intended to be—"a sufficient manual of chemistry for schools and junior students, and an aid to teachers wishing to introduce the science into the ordinary course of school study."

Mr. Gill's experience as teacher of chemistry and experimental physics at University College School appears to have been embodied in his book, if we may judge from its decided and perspicuous tone, and an evident intention

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